CONNECTICUT RIVER FLOOD CONTROL PROJECT

# HARTFORD, CONN.

CONNECTICUT RIVER, CONNECTICUT

# SPECIFICATIONS

FOR

# NORTH MEADOWS PUMPING STATION EQUIPMENT

FISCAL YEAR 1939 SECTION, ITEM HT.3
MECHANICAL AND ELECTRICAL EQUIPMENT - CONTRACT

WAR DEPARTMENT CORPS OF ENGINEERS, U.S. ARMY

U.S. ENGINEER OFFICE, PROVIDENCE, R.I.

CONNECTICUT RIVER FLOOD CONTROL PROJECT

# SPECIFICATIONS

FOR DESIGNING, CONSTRUCTING, AND FURNISHING EQUIPMENT

FOR NORTH MEADOWS PUMPING STATION

HARTFORD, CONNECTICUT

MAY 1, 1939

CORPS OF ENGINEERS, U. S. ARMY

U. S. ENGINEER OFFICE PROVIDENCE, R. I.

No. _____ Bidder _____ Invitation No. 699-39-295
(Do not write above this line)

STANDARD GOVERNMENT FORM OF INVITATION FOR BIDS
(Supply Contract)

War Department
United States Engineer Office,
Providence, R. I.
May 1, 1939.

SEALED BIDS, in duplicate, subject to the conditions named herein, will be received until 3:00 P.M., Daylight Saving Time, May 26, 1939, and then publicly opened, for furnishing pumping station equipment as called for in the accompanying schedule.

1. Drawings. - The drawings which will become a part of this contract are designated in Paragraphs 1-02 and 1-03 of the specifications. Where copies of drawings are requested a deposit of $10.00 will be required to insure their return. This deposit should be in the form of a United States money order or a certified check, made payable to "The Disbursing Officer, U. S. Engineer Office, Providence, Rhode Island." The $10.00 deposit for each complete set of drawings will be refunded upon return of said drawings in good condition within 60 days after date of opening bids.

2. Information required of bidder. - Each bidder shall submit with his bid and as a part of his proposal two sets of specifications of the equipment he proposes to furnish, including detailed description, general drawings, and photographs or illustrations showing the general construction and principal dimensions of the equipment. The bidder shall also submit with his bid all the information asked for in the accompanying Data Sheets.

3. Guarantee will be required with each bid as follows: Bid bond, Standard Form No. 24, will be executed in a penal sum approximately equal to and not less than 20 per cent of the total amount of the bid. Individual sureties will justify in sums aggregating not less than double the penalty of the bid bond. (See Paragraphs 8 to 11 Instructions to Bidders.)

4. Performance bond will be required as follows: A performance bond with good and sufficient surety or sureties, for the protection of the United States, Standard Form No. 25, will be executed in a penal sum approximately equal to and not less than fifty per cent (50%) of the full amount of the consideration of the contract.

5. Liquidated damages for delay will be prescribed. (See Paragraph 1-06 of the specifications, and Paragraph 5 of "Directions for Preparation of Contract" appearing on page 6 of United States Standard Form No. 32 (Revised).)

6. Partial payments will be made. (See Paragraph 1-07 of the specifications.)

7. Articles on patents will be made a part of the contract. (See Paragraph 1-20 of the specifications.)

8. Bids must be submitted upon the standard Government form of bid and the successful bidder will be required to execute the standard Government form of contract for supplies, United States Standard Form No. 32 (Revised).

9. Experience. - After the bids are opened any bidder may be required by the contracting officer to state whether he is now or ever has been engaged on any contract or other work similar to that proposed, the year in which it was done, and the manner of its execution, and to give such other information as will tend to show his ability to prosecute vigorously the work required by these specifications. The bid of any bidder who does not promptly comply with such a request may be rejected.

10. Bid and contract. - a. The bid form has an entry for the item on which quotation will be given or payment made, and no other allowances of any kind will be made unless specifically provided for in the specifications or the contract, or adjustments under Article 3 of the contract.

b. The quantity of material delivered in the unit given and the unit price stated by the bidder in the accepted bid will determine the total payment to accrue under the contract. The unit price bid must allow for all collateral or indirect cost connected with it.

11. Award of contract. - a. Subject to the rights hereinafter reserved, award will be made for all items of the Schedule to the lowest responsible bidder proposing to furnish equipment conforming to the requirements of the specifications, on the basis of the lowest delivered cost at Hartford, Connecticut, as may be deemed to be to the best interests of the United States. No award will be made for less than all the items of the Schedule.

b. A bid may be rejected if the bidder fails to submit the information required with his bid or cannot show that he owns, controls by firm option, or can procure the necessary equipment or material to make delivery at the time prescribed herein.

c. The right is reserved, as the interest of the Government may require, to reject any and all bids, and to waive any informality in bids received.

12. Walsh-Healy Act. - If the amount of the contract entered into pursuant to this advertisement exceeds $10,000.00, the provisions of the Act of June 30, 1936, Public No. 846 - 74th Congress, and the regulations adopted by the Secretary of Labor pursuant thereto will apply. If the contract does not exceed $10,000.00, the provisions of the Act

will not apply and Paragraph 13 of the Invitation, and Paragraphs 1-23, 1-24, 1-25, 1-26, and 1-27 of the specifications will be inoperative.

13. Manufacturer or regular dealer. - A bidder or contractor shall be deemed to be a "manufacturer" or "regular dealer" within the meaning of Section 1 (a) of the Walsh-Healey Act if he falls within one of the following categories:

a. A manufacturer is a person who owns, operates, or maintains a factory or establishment that produces on the premises the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications.

b. A regular dealer is a person who owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles, or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and sold to the public in the usual course of business.

Except as exempted by the Secretary of Labor, every bid received from any bidder who does not fall within one of the foregoing categories shall be rejected.

14. Submission of bids. - Envelopes containing bids must be sealed, marked, and addressed as follows:

Bid for Pumping Station Equipment.
To be opened at 3:00 P.M.
May 26, 1939.

To: The District Engineer,
U. S. Engineer Office,
819 Industrial Trust Bldg.,
Providence, R. I.

NOTE:- See Standard Government Instructions to bidders and copy of the standard Government form of contract, bid bond, and performance bond, which may be obtained upon application.

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Invitation No. 699-39-295

WAR DEPARTMENT

APPROPRIATIONS: 713022-658/9999-Emergency Relief, War Corps of Engineers, Public Buildings, Parks, Utilities, Flood Control, etc. (Transfer from WPA), 1938-1939.

21-408/00583 Public Works Administration Act of 1938 (Allotment to War, Flood Control), 1938-1940.

SPECIFICATIONS: For furnishing equipment for North Meadows Pumping Station, Hartford, Connecticut.

## SECTION I. GENERAL PROVISIONS

1-01. Work to be done. - a. The work provided for herein is authorized by the Flood Control Act approved June 28, 1938 (Public No. 761, 75th Congress).

b. The work to be done consists of designing, constructing, and furnishing in accordance with these specifications and the drawings mentioned in Paragraphs 1-02 and 1-03 hereof, the following equipment:

(1) Three 36-inch vertical, mixed-flow, volute-type pumps complete with inlet and discharge piping, and valves.

(2) One 16-inch vertical, mixed-flow, volute-type pump complete with electric driving motor, inlet and discharge piping, and valves.

(3) Three 4-cycle, heavy-duty, stationary-type, internal combustion engines complete with silencers, for driving the 36-inch pumps.

(4) Three right angle gear units for connecting the 36-inch pumps and the gasoline engines.

c. The equipment will be unloaded from the carrier, transported to the site, and installed by other agencies. The contractor shall furnish all anchor bolts necessary for fastening the equipment to its foundations.

d. It is the spirit and intent of these specifications to secure for the United States the pumping units, gasoline engines, electric motor, right angle gear drives, piping, and valves complete in all respects and ready for installation, and the above condition shall be complied with whether all parts of the assemblies are specifically mentioned or not.

1-02. Drawings furnished by the Government. - The work shall conform to the drawings marked "Connecticut River Flood Control, North Meadows Pumping Station" as indicated below, which form a part of these specifications and are filed in United States Engineer Office, Providence, Rhode Island. These drawings show the general arrangement of the apparatus, and certain required and limiting dimensions, but are not to be taken as defining the detailed design of the equipment.

LIST OF DRAWINGS

| Sheet No. | Title | File No. |
|---|---|---|
| 1 | Project Location and Index | CT-4-1623 |
| 2 | General Arrangement of Equipment - No. 1 | CT-4-1624 |
| 3 | " " " " No. 2 | CT-4-1625 |
| 4 | " " " " No. 3 | CT-4-1626 |
| 5 | Plumbing and Heating No. 1 | CT-4-1627 |
| 6 | " " " No. 2 | CT-4-1628 |
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| 8 | Gasoline Piping System | CT-4-1630 |
| 9 | " " Details | CT-4-1631 |
| 10 | Exhaust Piping | CT-4-1632 |

Ten sets of prints of the drawings prepared by the Government will be furnished the contractor without charge. Additional prints will be furnished upon request, at the cost of printing.

1-03. Drawings required of contractor. - a. Detail. - The contractor shall submit to the contracting officer for approval sufficient assembly and detailed drawings to fully demonstrate that the equipment to be furnished under the contract will conform to the provisions and intent of these specifications. The contractor shall submit two prints of each of such detailed drawings to the contracting officer, who will return one print with his approval or with notations of such changes as he finds to be necessary. After approval, the contractor shall furnish the contracting officer six prints of each approved drawing. Each print submitted for approval shall have, in the lower right-hand corner just above the title, a white space 3 inches by 4 inches in which the contracting officer can indicate the action taken. All of these drawings form a part of the specifications and approval of drawings by the contracting officer shall not relieve the contractor of full responsibility for the correct fitting of parts and satisfactory assembly.

b. Erection drawings. - Before delivery of the equipment, the contractor shall furnish the contracting officer six prints of erection drawings indicating the relationship of all match marks painted or stamped on the several parts.

1-04. Contractor's guaranty. - a. The contractor guarantees the equipment furnished by him against defects of design, material, and workmanship for a period of one year after the date of acceptance and any parts

proving defective within that time shall be promptly replaced by him without cost to the Government.

b. It is expressly understood that the performance bond shall cover both the bidder's and contractor's guaranties.

1-05. Time of delivery. - The equipment shall be delivered at the f.o.b. point named in the contract within the number of calendar days stated in the following tabulation, time being computed from the date of receipt by the contractor of notice to proceed:

| | | |
|---|---|---|
| Item 1 - | 3 intake castings | = 75 days |
| | Balance of equipment under Item 1 | = 150 days |
| Item 2 - | 1 intake casting | = 75 days |
| | Balance of equipment under Item 2 | = 150 days |
| Item 3 - | Embedded exhaust pipes (4) | = 100 days |
| | Balance of equipment under Item 3 | = 150 days |
| Item 4 - | 3 right angle gear units | = 150 days |

1-06. Liquidated damages for delay. - If the contractor fails or refuses to complete the delivery of all the equipment included in any of the groups of equipment for which a time of delivery is stipulated in Paragraph 1-05 within the time thus determined and agreed upon, plus any extensions duly granted under the terms of the contract, the contractor shall pay to the Government as liquidated damages the sum of $10.00 (ten dollars) per calendar day of delay for each such group of equipment, the delivery of which is so delayed.

1-07. Payment. - a. Fifty (50) per cent of the contract price of each complete pump, gasoline engine, or gear unit, as the case may be, will be paid upon completion, to the satisfaction of the contracting officer, of all shop assembly and tests.

b. When the terms of the contract have been fully complied with, and all the apparatus has been installed, tested, and accepted by the contracting officer, final payment will be made of the balance due under the contract.

1-08. Packing and shipment. - All parts likely to be lost or damaged in shipment shall be adequately boxed or crated, and each box or crate shall be marked to show the parts contained therein. All exposed finished surfaces on large parts shall have wooden pads bolted on, or shall be otherwise properly protected. The contractor shall provide all lumber, bolts, etc., necessary for proper protection.

1-09. Marking. - All parts of the equipment shall be marked and match marked for identification and to facilitate field assembly.

1-10. Weighing. - The contractor shall, in the presence of the contracting officer or an appointed inspector, weigh all completed parts

and accessories on accurate scales, and the complete list of all such net weights, exclusive of boxes, crates, or skids, shall be furnished the contracting officer. The net weight of each of the larger pieces shall also be painted on the piece or stated on a tag securely attached thereto.

1-11. Manufacturer's name plate. - The contractor shall attach a small brass name plate on the principal parts of each unit, giving the manufacturer's name and address, and the principal rating data of the equipment.

1-12. Work covered by price bid. - The contractor shall, under the contract unit price, prepare all necessary shop drawings; furnish and pay for all material and labor and all permanent, temporary, and incidental work; furnish all accessories; and deliver and do all work which may be required by the contracting officer to carry out the contract in good faith, which contemplates everything complete, in good working order, of good material, and with accurate workmanship, skillfully fitted and properly connected.

1-13. Inspection. - The work will be inspected in accordance with Article 4 of the contract by inspectors appointed by the contracting officer. The inspectors will make a rigid inspection of all materials and work done and any material or workmanship found to be defective or not in accordance with the plans and specifications will be rejected and shall be replaced by satisfactory material or workmanship without charge to the Government. The presence of the inspector will not relieve the contractor or his responsible agent of any responsibility for the proper execution of the work. The acceptance of any material or finished member by an inspector shall not prevent subsequent rejection if such material or member is later found to be defective.

1-14. Standard test and quality. - a. All materials, supplies, and parts and assemblies thereof, entering into the equipment to be furnished under these specifications, shall be tested, as specified or otherwise required, in conformity with the best modern approved methods for the particular type and class of work.

b. Unless waived in writing by the contracting officer, all tests and trials shall be made in the presence of an appointed inspector. When the presence of the inspector is so waived, sworn statements, in duplicate, of the tests made and the results thereof, shall be furnished to the contracting officer by the contractor.

c. The costs of all shop tests and trials shall be borne by the contractor and will be included in the contract unit price.

d. All materials, parts, and equipment shall be of the highest grade, free from defects and imperfections, of recent manufacture, and unused. Workmanship shall be of the highest grade and in accordance with the best modern standard practice.

1-15. Standard stock articles. - All materials, supplies, and articles furnished shall, wherever so specified, and otherwise wherever practicable, be the standard stock products of recognized reputable manufacturers. The standard stock products of manufacturers other than those specified will be accepted when it is proved to the satisfaction of the contracting officer that they are equal in strength, durability, usefulness, and convenience for the purpose intended.

1-16. Protection of stored materials. - All materials, supplies, and articles stored at the contractor's plant shall be adequately housed by the contractor or otherwise protected by him against deterioration and damage.

1-17. Service of erecting engineer. - a. The installation of the equipment is not included in this contract, but will be done by other agencies. However, the contractor shall furnish promptly upon written notice by the contracting officer, the services of a competent erecting engineer to supervise and direct the erection and installation of this equipment. The services of the erecting engineer will be paid for by the Government at an allowance of twenty-five dollars ($25.00) per calendar day from the time of departure from, to the time of return to, his home station; such allowance to cover salary, travel, and living expenses of the erecting engineer and any other costs occasioned by the furnishing of the service. No payment will be made for services of the erecting engineer in connection with alterations to any of the equipment occasioned by failure of such equipment to comply with the requirements of the specifications.

b. The erection and installation of the equipment by other agencies under the direction and supervision of the contractor's erecting engineer shall in no way relieve the contractor of sole responsibility for the equipment meeting all the requirements of these specifications and fulfilling all the contractor's guaranties.

1-18. Protests and appeals. - The Chief of Engineers has been designated by the Secretary of War as his duly authorized representative to make final decision and to take other action where the terms of the contract require that such decision or action shall be "By the head of the department concerned or his duly authorized representative." If the contractor considers any work required of him to be outside the requirements of the contract, or if he considers unfair any action or ruling of the inspectors or contracting officer, he shall immediately ask for written instructions or decision from the contracting officer. Any protest based upon such instructions or decision, or claim otherwise arising under the contract, including a request for extension of time under Article 5, shall be submitted to the contracting officer within the period specified in the contract. If the contractor is not satisfied with the ruling of the contracting officer, he may, where so provided in the contract, make written appeal to the Chief of Engineers. Such appeals, containing all the facts and circumstances upon which the contractor bases his claim for relief, shall be addressed to the Chief of Engineers, United States Army,

and presented to the contracting officer for transmittal within the times provided therefor in the contract. (See articles 2 and 12 of the contract).

1-19. Minor modifications. - The right is reserved to make such minor changes in the execution of the work to be done under these specifications as, in the judgment of the contracting officer, may be necessary or expedient to carry out the intent of the contract, provided that the unit cost to the contractor of doing the work shall not be increased thereby; and no increase in unit price over the contract rate will be paid to the contractor on account of such changes.

1-20. Patents. - The contractor shall hold and save the Government, its officers, agents, servants, and employees, harmless from liability of any nature or kind, including costs and expenses, for or on account of any patented or unpatented invention, articles or appliance manufactured or used in the performance of this contract, including their use by the Government.

1-21. Foreign materials authorized in public works. - a. Because the materials listed below, or the materials from which they are manufactured, are not mined, produced, or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality, their use in the work herein specified (subject to the requirements of the specifications) is authorized without regard to the country of origin:

| | | | |
|---|---|---|---|
| Platinum | China Wood oil | Chromium | Cork |
| Tin | (Tung Oil) | Asbestos | Lac |
| Balsa Wood | Silk | Sisal | English Ball Clay |
| Natural Copper-Nickel Alloy | Jute | Karigum | English China Clay |
| | Nickel | Rubber | Teakwood |

b. Articles, materials, or supplies manufactured in the United States and containing mercury, antimony, tungsten, or mica of foreign origin, may be used (subject to the requirements of the specifications) in the work herein specified because such manufactured articles, materials, or supplies have been manufactured in the United States substantially all from articles, materials, or supplies mined, produced, or manufactured, as the case may be, in the United States.

1-22. Federal, State, County, and Municipal taxes. - a. Prices bid herein include any Federal tax heretofore imposed by the Congress which is applicable to the material on this bid. If any sales tax, processing tax, adjustment charge, or other taxes or charges are imposed or changed by the Congress after the date set for the opening of this bid and made applicable directly upon the production, manufacture or sale of the supplies covered by this bid and are paid to the Government by the contractor on the articles or supplies herein contracted for, then the prices named in this bid will be increased or decreased accordingly, and any amount due the contractor as a result of such change will be

charged to the Government and entered on vouchers (or invoices) as separate items.

b. The prices herein do not include any Federal taxes from which exemption is granted or as to which a credit or refund is provided for under the provisions of section 401 of the Revenue Act of 1935 (act of August 30, 1935; 49 Stat. 1014; 1025-1026), as amended, nor any tax imposed by a State, County, or Municipality upon the transaction of this procurement of these materials.

1-23. Representations and stipulations pursuant to Public Act No. 846 - 74th Congress. - a. The contractor is the manufacturer of or a regular dealer in the materials, supplies, articles, or equipment to be manufactured or used in the performance of the contract.

b. All persons employed by the contractor in the manufacture or furnishing of the materials, supplies, articles, or equipment used in the performance of the contract will be paid, without subsequent deduction or rebate on any account, not less than the minimum wages as determined by the Secretary of Labor to be the prevailing minimum wages for persons employed on similar work or in the particular or similar industries or groups of industries currently operating in the locality in which the materials, supplies, articles, or equipment are to be manufactured or furnished under the contract: Provided, however, that this stipulation with respect to minimum wages shall apply only to purchases or contracts relating to such industries as have been the subject matter of a determination by the Secretary of Labor.

c. No person employed by the contractor in the manufacture or furnishing of the materials, supplies, articles, or equipment used in the performance of the contract shall be permitted to work in excess of eight hours in any one day or in excess of forty hours in any one week, unless such person is paid such applicable overtime rate as has been set by the Secretary of Labor.

d. No male person under sixteen years of age and no female person under eighteen years of age and no convict labor will be employed by the contractor in the manufacture or production or furnishing of any of the materials, supplies, articles, or equipment included in the contract.

e. No part of the contract will be performed nor will any of the materials, supplies, articles, or equipment to be manufactured or furnished under said contract be manufactured or fabricated in any plants, factories, buildings, or surroundings or under working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees engaged in the performance of the contract. Compliance with the safety, sanitary, and factory inspection laws of the State in which the work or part thereof is to be performed shall be prima-facie evidence of compliance with the sub-section.

f. Any breach or violation of any of the foregoing representations and stipulations shall render the party responsible therefor liable to the United States of America for liquidated damages, in addition to damages for any other breach of the contract, in the sum of ten dollars ($10.00) per day for each male person under sixteen years of age or each female person under eighteen years of age, or each convict laborer knowingly employed in the performance of the contract, and a sum equal to the amount of any deductions, rebates, refunds, or underpayment of wages due to any employee engaged in the performance of the contract; and, in addition, the agency of the Government entering into the contract shall have the right to cancel same and to make open market purchases or enter into other contracts for the completion of the original contract, charging any additional cost to the original contractor. Any sums of money due the Government by reason of any violation of any of the representations and stipulations of the contract as set forth herein may be withheld from any amounts due on the contract or may be recovered in a suit brought in the name of the United States of America by the Attorney General thereof. All sums withheld or recovered as deductions, rebates, refunds, or underpayments of wages shall be held in a special deposit account and shall be paid, on order of the Secretary of Labor, directly to the employees who have been paid less than minimum rates of pay as set forth in such contracts and on whose account such sums were withheld or recovered; Provided, that no claims by employees for such payments shall be entertained unless made within one year from date of actual notice to the contractor of the withholding or recovery of such sums by the United States of America.

g. The contractor shall post a copy of the stipulations in a prominent and readily accessible place at the site of the contract work and shall keep such employment records as are required in the Regulations under the Act available for inspection by authorized representatives of the Secretary of Labor.

h. The foregoing stipulations shall be deemed inoperative if this contract is for a definite amount not in excess of ten thousand dollars ($10,000).

1-24. Schedule of minimum wage rates applicable to this contract under subparagraph 1-23b above. - No determination of minimum rates applicable to this contract has been made by the Secretary of Labor. Subparagraph b of the stipulations contained in Paragraph 1-23 above, is therefore, inoperative to this contract.

1-25. Employees affected. - The stipulations set forth in Paragraph 1-23 above shall be deemed applicable only to employees engaged in or connected with the manufacture, fabrication, assembling, handling, supervision, or shipment of materials, supplies, articles, or equipment required under the contract and shall not be deemed applicable to office or custodial employees.

1-26. Overtime. - The right of pay for overtime under subparagraph c

of the stipulations, set forth in Paragraph 1-23 above, shall be one and one-half (1-1/2) times the basic hourly rate or piece rate received by the employee. If in any one week or part thereof an employee is engaged in work covered by the contractor's stipulations, his overtime shall be computed after eight hours in any one day or after forty hours in any one week during which no single daily total of employment may be in excess of eight hours without payment of the overtime rate.

1-27. Records of employment. - Pursuant to the act referred to in Paragraph 1-23 above, and the regulations adopted pursuant thereto, the contractor shall maintain the following records of employment which shall be available for the inspection and transcription of authorized representatives of the Secretary of Labor:

a. Name, address, sex, and occupation of each employee covered by the contract stipulations.

b. Date of birth of each such employee under twenty-one years of age.

c. Wage and hour records for each such employee including the rate of wages and the amount paid each pay period, the hours worked each day and each week and the period during which each such employee was engaged on a Government contract, with the number of such contract. Compliance with this sub-section shall be deemed complete if wage and hour records for all employees in the plant are maintained during the period between the award of any Government contract and the date of delivery of the materials, supplies, articles, or equipment; Provided, that where no separate records for employees engaged on Government contracts are maintained, it shall be presumed, until affirmative proof is presented to the contrary, that all employees in the plant from the date of award of any such contract until the date of delivery of the materials, supplies, articles, or equipment were engaged on such Government contract. Such records shall be kept on file for at least one year after the termination of the contract.

1-28. Interpretation of specifications. - On all questions relating to the acceptability of material, machinery, classification of materials, the proper execution of the work, and the interpretation of the specifications, the decision of the contracting officer shall be final, subject to appeal as provided for in Article 12 of the contract.

1-29. Final acceptance and payment. - When all the work called for under this contract has been completed, the contracting officer will make a thorough examination of same, and if it is found to fully comply with the requirements of the contract, it will be accepted and final payment will be made.

1-30. Approval. - The contract shall be subject to the written approval of the Division Engineer, North Atlantic Division, U. S. Army, and will not be binding until so approved.

## SECTION II. PUMPS (Items 1 and 2).

2-01. Work included. - Under Item 1 the contractor shall furnish three 36-inch vertical, mixed-flow pumps. Under Item 2 the contractor shall furnish one 16-inch vertical, mixed-flow pump. The 36-inch pumps shall be furnished complete with all intermediate shafting, couplings, bearings, inlet and discharge piping, gate valves, and check valves. The 16-inch pump shall be furnished complete with electric driving motor and intermediate shafting, couplings, bearings, inlet and discharge piping, gate valves and check valve.

2-02. Description of pumps. - a. The pumps shall be vertical, mixed-flow pumps of the bottom-suction, horizontal-discharge, volute type designed for handling sewage and storm water. Pumps of the axial flow type will not be accepted.

b. The pumps shall operate smoothly and quietly, and without excessive vibration, pounding, rattling, bumping, water hammer, or evidence of excessive velocity, unnecessary turbulence, or cavitation. All parts shall be so designed and proportioned as to have ample strength, stability, and stiffness. Ample room shall be provided for inspection, repair, and adjustment.

2-03. Operating conditions. - The pumps shall be capable of satisfactory operation, and shall meet all the requirements of these specifications under the following operating conditions:

| | |
|---|---|
| Minimum low water elevation of pond | = + 4.0 feet |
| Normal water elevation of pond | = + 6.0 feet |
| Maximum high water elevation of pond | = + 10.0 feet |
| Elevation of pump room floor | = - 5.0 feet |
| Elevation bottom of discharge conduit | = + 2.0 feet |
| Elevation bottom of suction intake | = - 5.0 feet |

2-04. Capacities. - a. Each of the three pumps under Item 1 shall have characteristics to comply with or exceed the following tabulation and shall be guaranteed to deliver 35,000 g.p.m. against a 20-foot total head.

45,000 g.p.m. at 5 feet total head

35,000 " " 20 " " "

10,000 " " 35 " " "

The pumps shall be so designed that they will operate at maximum efficiency against a total head of about 20 feet.

b. The pump under Item 2 shall have characteristics to comply with or exceed the following tabulation and shall be guaranteed to deliver 5,000 g.p.m. against a 13-foot total head.

5,000 g.p.m. at 13 feet total head

3,000 " " 21 " " "

The pump shall be so designed that it will operate at maximum efficiency against a total head of about 13 feet.

c. Each pump shall operate at a constant speed under all conditions of head and this speed shall not exceed 400 r.p.m. for the 36-inch pumps and 600 r.p.m. for the 16-inch pump. The specific speed shall be within conservative limits which shall not in any case exceed the maximum for the condition specified or established by the Hydraulic Institute, insofar as they may apply. The direction of rotation and the location of the intake and discharge shall be as shown on the drawings.

2-05. Casings. - a. The pump casings shall be of the volute type, made of high-grade cast iron of ample strength to withstand safely all stresses that will be imposed during erection and operation. Each casing shall be tested and made tight in the contractor's shop under a hydrostatic test pressure of 2-1/2 times shut-off head of the pump.

b. The casing shall be provided with a removable top head that will permit the removal of the impeller from the top of the pump without disturbing the suction or discharge connections. The head may be made solid or in halves and bolted together. The head shall be provided with a concentric shoulder joint where it is bolted to the casing, so as to secure proper alignment.

c. Hand holes shall be provided in the casing and suction nozzle to provide access to both sides of the impeller. The interior surfaces of the covers shall be shaped to continue the contour of the interior of the casing. The casing shall be constructed without stationary guide vanes or diffusion vanes. The hand-hole covers shall be provided with lever handles for hand operation, so that they can be quickly swung open, reclosed, and bolted.

d. The casing shall be provided with substantial lugs or feet to support the pump firmly on its foundation. Sole plates of steel or cast iron shall be provided. The casing shall also be provided with eye bolts for lifting and tapped holes for drains. The high point of the casing shall be fitted with a vent pipe connection and valve, so that air or gas may be relieved from the main body of the

pump. A suitable connection shall be provided for draining the pump when the valves in the suction and discharge lines are closed. Flanges shall be cast solid and shall be faced and drilled to conform to the American Standard for 125-Pound Pressure. Flanges shall be spot-faced on the back for all bolt holes. The design of the casing shall be heavy and rigid so as to safely resist, without distortion, the stresses due to impeller thrust and bearing loads.

2-06. Impellers. - The impellers shall be of the mixed flow, single, end suction type cast in one piece of cast steel, bronze, or of a special alloy cast iron containing not less than 1-1/2 per cent nickel and having a tensile strength of not less than 30,000 pounds per square inch. Each impeller shall be finished all over to a smooth surface and shall be statically and dynamically balanced. The impeller shall be securely locked to the shaft in such a manner as to prevent damage in case the direction of rotation should become reversed for any reason. The impellers shall have openings of a sufficient size to pass spheres 6 inches in diameter for the 36-inch pump and 4 inches in diameter for the 16-inch pump.

2-07. Wearing rings. - In the event that an open type impeller pump is furnished, a removable bronze wearing ring of an approved type shall be provided in the casing at the point between the impeller and suction chamber. Should a closed type impeller pump be furnished, bronze wearing rings shall be provided both on the impeller and the casing. The rings shall be machined and constructed to minimize the leakage through them and shall be designed for easy removal and replacement. The design and position of the wearing rings shall be such that wedging of solids flowing along with the water will be avoided.

2-08. Pump shaft. - a. The pump shaft shall be made of forged high-grade, open-hearth steel thoroughly annealed and accurately machined to finished dimensions. It shall be of ample size to transmit the loads without whip, vibration, or undue deflection at all speeds from zero to maximum. The first critical speed of the pump rotor, consisting of the shaft, impeller, and couplings, shall be not less than 150 per cent of the normal running speed.

b. The portion of the shaft within the pump coming in contact with water shall be protected by a removable bronze sleeve extending through the stuffing box. This sleeve shall be securely fastened to the shaft and hold tight against the impeller hub. The sleeve shall be securely fastened to the shaft so that either forward or reverse rotation of the pump will not cause it to loosen. The bronze sleeves shall be properly machined and ground to finished dimensions.

2-09. Stuffing box and gland. - Leakage along the pump shaft shall be prevented by means of an approved stuffing box and gland, designed to take sufficient packing to insure tight joints without undue pressure on the shaft. The stuffing box shall be provided with a bronze lantern

ring to furnish lubrication and sealing with grease. The packing gland shall be of bronze of the split type to allow removal without disturbing any other parts of the pump. The gland bolts shall be of the swing type made of bronze with bronze nuts.

2-10. Bearings for 36-inch pumps. - The pump bearings shall be two in number and shall be of the anti-friction, grease lubricated type. The bearings shall be designed for heavy duty continuous service and shall be of ample capacity to carry the load. One bearing shall be of the radial ball or roller bearing type and each ball bearing shall be provided with at least two rows of balls. The other bearing shall be a combined radial and thrust bearing and shall be capable of carrying, without undue stress in any of its parts, the weight of all rotating parts and the maximum unbalanced hydraulic thrust of the pump. The bearing shall be mounted in the main frame and shall be readily removable. All bearings shall be designed to operate under all conditions of operation that may be expected including the flooding of the pump room and shall include a reservoir for 24 hours supply of lubricant.

2-11. Intermediate shaft for 36-inch pump. - a. The intermediate shaft for connecting the right angle reduction gear to the pump shall be made in two sections. The lower section shall be of sufficient length to permit complete disassembling of the rotating element without disturbing the pump casing or the reduction gear. The coupling connecting the lower length of intermediate shaft to the pump shaft shall be of the rigid, forged, flanged type. The coupling between the lower length of intermediate shaft and the upper length of intermediate shaft shall be a flexible coupling of the rubber-bushed, or other approved type. The coupling between the right angle reduction gear and the intermediate shaft (upper length) shall be of the rigid, forged, flanged type.

b. One intermediate guide bearing shall be provided for the intermediate shaft, and shall be mounted as shown on the drawings. The bearing shall be of the anti-friction type and grease lubricated. All the intermediate shafting shall be of forged, open hearth steel thoroughly annealed and accurately machined to finished dimensions.

2-12. Bearings for 16-inch pump. - The contractor may provide either a solid or hollow shaft motor for driving the 16-inch pump. Unless a separate thrust bearing is provided with the pump the entire weight of the rotating element and hydraulic thrust shall be carried by an approved anti-friction thrust bearing at the top of the motor, otherwise the pump bearings shall be two in number and shall be of the anti-friction, grease-lubricated, ball or roller bearing type designed for heavy duty continuous service. One bearing shall be of the radial ball or roller bearing type and each ball bearing shall be provided with at least two rows of balls. The other bearing shall be a combined radial and thrust bearing and shall be capable of carrying without undue stress in any of its parts, the weight of the rotating parts and the maximum

unbalanced hydrostatic load of the pump. The bearing shall be mounted in the main frame and shall be readily removable. All bearings shall be designed to operate even through an emergency; such as, flooding of the pump room and shall include a reservoir for 24 hours' supply of lubricant.

2-13. Intermediate shaft for 16-inch pump. - The intermediate shaft for connecting the motor to the 16-inch pump shall be made in two sections. The lower section shall be of sufficient length to permit complete disassembling of the rotating element without disturbing the pump casing or the driving motor. If the thrust bearing is incorporated in the motor, the couplings shall be of rigid flanged type. If a separate thrust bearing is provided for the pump, the coupling between the lower length of intermediate shaft and the upper length of intermediate shaft shall be a flexible coupling of the rubber bushed type or other approved type. The couplings connecting the lower length of the intermediate shaft to the pump shaft, and the upper length of intermediate shaft shall be of the solid forged, flanged type. One intermediate guide bearing shall be provided for the intermediate shaft. The bearing shall be of the anti-friction type grease lubricated. The intermediate shaft shall be of forged, open-hearth steel thoroughly annealed and accurately machined to finished dimensions.

2-14. Pump manufacture. - All pumps to be furnished under Items 1 and 2 shall be made by the same manufacturer. All like parts of the pumps shall be made to limit gages so as to be interchangeable.

2-15. Accessories. - There shall be furnished one complete set of all necessary special wrenches mounted in an approved metal case.

2-16. Shop test. - a. Each pump shall be subjected to and successfully pass in the shops of the manufacturer, hydrostatic pressure and actual running tests. All shop tests shall be subject to witness by the contracting officer or his authorized representative. The contractor shall give notice in writing at least five days prior to the date on which any pumping unit will be ready for test. With this notice, there shall be submitted the diagram of the set-up of the unit and the testing apparatus.

b. The hydrostatic test pressure shall be not less than two and one-half times the shut-off head of the pump, as shown by the characteristic curve. The running test shall be made with each unit driven by the manufacturer's test motor.

c. The test shall be conducted in accordance with the test code of the Hydraulic Institute and shall show before acceptance of the units that the pumps have general characteristics of head, capacity and efficiency as shown by the characteristic curve submitted by the contractor. A certified copy of the test log sheet and test curves shall be furnished the contracting officer.

2-17. Electric motor. - a. The electric driving motor for the 16-inch pump shall be a squirrel-cage, vertical shaft induction motor with ring base for securing to the foundation. It shall be designed to operate on 220-volt, 3-phase, 60-cycle current, with a limiting temperature rise of 40 degrees C. above an ambient of 40 degrees C., and shall conform to the standards of the National Electrical Manufacturers Association and the American Institute of Electric Engineers. The horsepower rating of the motor shall be not more than 25 horsepower and not less than the maximum power required by the pump within its specified operating range. It shall be suitable for full voltage starting and shall have a starting torque of not less than 120 per cent of full load torque and a breakdown torque of not less than 200 per cent of full load torque. It shall be of the low starting current type with electrical characteristics similar or equal to the General Electric Company Type KF.

b. Stator winding insulation. - The stator and rotor windings shall be insulated with Class A insulation which shall be thoroughly impregnated with insulating compound to render the insulation resistant to water and moisture during long periods of idleness.

c. Mechanical construction. - The frame shall be of close grained cast iron or semi-steel, the foot being integral with the frame or of equally strong construction. All ferrous parts shall be so treated as to effectively resist corrosion. The shaft shall be of high-grade steel of ample size to drive the pump and shall be accurately machined and made according to accepted standards.

d. Bearings. - The lower guide bearings shall be of the sleeve type, oil lubricated. The thrust bearing shall be of the ball or ball and roller type for oil lubrication, and shall be of sufficient capacity to take the thrust of the pump in addition to the weight of the rotating parts, providing a separate thrust bearing is not provided on the pump.

2-18. Gate valves. - The gate valves shall be Crane No. 791, Chapman No. 58-1/2, or equal, iron-body brass trimmed, non-rising stem, double-disc gate valves. The 36-inch valves shall be rated at 43 pounds per square inch cold water working pressure and the 16-inch valves shall be rated at 50 pounds per square inch cold water working pressure. Bypasses will not be required. All valves shall be flanged, with flanges drilled in accordance with the American 125-Pound Standard.

2-19. Check valves. - The check valves shall be Chapman List 23, or equal, tilting disc, non-slam check valves suitable for 50 pounds per square inch cold water working pressure. The body and disc shall be fitted with bronze seat rings, and the hinge pin and hinge pin bushings shall be of stainless steel. The body shall have smooth flow lines without pockets or recesses, and the net area of the waterway through each check valve shall not be less than the net area of the pipe line

in which it is installed. Flanges shall be drilled in accordance with the American 125-Pound Standard.

2-20. Inlet and discharge piping. - The inlet and discharge piping for the 36-inch and 16-inch pumps shall be Class A American Water Works Standard cast-iron flanged pipe and fittings with flanges drilled to 125-Pounds American Standard. The design of the intake and discharge castings shall be subject to the approval of the contracting officer. All flanged connections shall be provided with full-face red rubber gaskets. The flanged connections shall be bolted together with American Standard machine bolts having square heads, hexagon nuts.

2-21. Field tests. - After installation, each pump will be operated and tested for a sufficient period of time to demonstrate that the equipment is in satisfactory operating condition and that it meets the requirements of these specifications. The tests will be made to demonstrate proper balance and mechanical performance and will be made at whatever pumping heads are available. Any alterations necessary to bring the pumps, electric motor, inlet and discharge piping, or valves, up to the requirements of the specifications shall be made by and at the expense of the contractor.

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## SECTION III. GASOLINE ENGINES (Item 3)

3-01. Work included. - The contractor shall furnish in accordance with the drawings and specifications three gasoline engines suitable for driving the 36-inch pumps through right-angle gear-reduction units. The engines shall be furnished complete with silencers, exhaust lines, connections to water and fuel lines, and flexible couplings to the gear-reduction unit. One extra exhaust line blanked off for a future installation shall be furnished for embedding in the building wall as shown on the drawings. The cost of this extra exhaust line shall be included in the contract unit price for Item 3.

3-02. Type. - Each engine shall be of the four-cycle, internal-combustion, heavy-duty, stationary type having not less than 6 cylinders. The engine shall be a standard manufactured type and model built by a manufacturer who has been regularly manufacturing such engines for a period of at least five years. All engines furnished under this item shall be of the same type and manufacture.

3-03. Ratings. - The engine shall operate at a governed speed not exceeding 1200 r.p.m. The continuous rated horsepower of the engine with auxiliaries shall be not less than 115 per cent of the maximum horsepower required at the engine side of the gear-reduction unit. The engine shall be so designed that no torsional critical speed exists within the operating speed range.

3-04. Construction. - The engine shall be ruggedly constructed for heavy-duty service and long life. The cylinder block shall be a one-piece grey iron casting, or the cylinders shall be cast in pairs. The cylinder block shall be cast separately from the crankcase. The inner walls shall provide for full length of the piston travel and shall be water jacketed for their full length. Exhaust valves shall be constructed of heat and corrosion resisting steel. They shall be of large area accurately fitted and ground. The valve seats shall be fitted with valve seat inserts. Inlet valves shall be of special steel to prevent warping or pitting after long periods of operation. Pistons shall be of high-grade aluminum alloy or close-grained cast iron and of such construction as to provide uniform expansion of piston skirt. Each piston shall have at least four piston rings. The cam shaft shall be of case hardened alloy steel with integral cams. The cam faces and bearing surfaces shall be carburized, hardened and ground finished to size. The crankshaft shall be an alloy-steel die forging, fully counterweighted and dynamically and statically balanced. The crankshaft shall be drilled to provide oil feed from the pressure system to crank pin and wrist-pin bearings. Main and crank pin bearings shall be accurately ground to size.

3-05. Bearings and lubrication. - a. The number of main bearings for each engine shall be one more than the number of cylinders. All crankshaft bearing caps shall be accurately fitted and provisions made to eliminate side thrust on bearing cap studs. Bearings shall be bronze-backed, babbitt-lined, removable, and replaceable.

b. All internal parts of the engine shall be provided with force feed lubrication from a self-contained oiling system. A readily removable gear type pressure pump shall be mounted on the engine to supply lubricating oil under pressure and a hand pump shall be provided for forcing oil to all bearings prior to starting the engine. Oil filters shall be of full flow type construction readily removable for cleaning. Oil cooling heat exchangers shall be provided.

3-06. Ignition and starting system. - a. A 12-volt battery-type dual ignition system shall be provided, with two independently driven distributors, at least two heavy-duty ignition coils, and not less than two spark plugs in each cylinder, fired simultaneously.

b. Two 12-volt, heavy-duty electric cranking motors shall be provided for starting each engine. Each starting motor shall be controlled by a 12-volt magnetic switch, the two switches being actuated simultaneously by a push button switch on the engine panel board. The cranking motors shall be capable of cranking the engine at sufficient speed to insure starting when the engine is connected to the pump through the gear-reduction unit, with the pump casing full of water, and with a 35 degree F. ambient engine room temperature. Suitable provision shall be made to prevent operation of the engine cranking motors except w hen the spark control level is in full-retard position.

c. One 12-volt electric storage battery shall be provided with each engine. The battery shall be of sufficient capacity that when fully charged it will give four starting attempts of 30 seconds each with one minute rest periods between, with the pump full of water and at an ambient engine room temperature of 35 degrees F. The battery shall be assembled in a 6-cell unit in rubber jars having high ribs to provide large sediment space, hard rubber cell covers with grease ring seal nuts to keep the tops of the cells clean and dry, and vent plugs constructed to prevent the escape of electrolyte spray. Separators shall extend above and below the plates and the plates shall effectively retain the active material. The electrolyte shall be of the low-gravity type with a specific gravity of about 1.210. The battery shall be Type MVM as manufactured by the Electric Storage Battery Company of Philadelphia, or its equal, and shall conform to the specifications for United States Government award by Treasury Department, Procurement Division, Branch of Supply for lead-acid storage batteries, Class 17, Item B-8680. The battery shall be installed on a neatly finished wooden platform with lead tray, located adjacent to the engine and of a form convenient for handling batteries.

3-07. Fuel system. - a. The engine shall operate satisfactorily and comply with these specifications when using gasoline fuel conforming to Federal Specification VV-G-101a and having an octane rating of 65-70. The fuel system shall conform to the requirements of the National Board of Fire Underwriters.

b. Each carburetor shall be of the heavy-duty type

equipped with a drip pan and a suitable connection for drain back to the storage tank. The air intake of the carburetor shall be provided with an air cleaner and backfire flame arrester of approved make.

c. Each engine shall be equipped with two engine-driven diaphragm type gasoline pumps suitable for pumping the gasoline from the tanks to the engine. The tanks and supply piping will be furnished by others and will be installed at the locations shown on the drawings. Also each engine shall be provided with a hand-operated fuel pump with a pressure-relief bypass with spring-loaded valve set to unload at 4 pounds per square inch. Connections to gasoline lines shall be made with flexible seamless bronze hose with woven wire protection and packless couplings.

3-08. Cooling system. - The engines shall be water cooled with water obtained from pumps furnished by others and installed as indicated on the drawings. A lever-operated gate valve arranged to lock in the open and closed positions shall be installed in the cooling water intake. The operating handle of the valve shall be electrically interlocked with the engine ignition circuit so as to prevent the operation of the engine unless the cooling water valve is fully open. There shall be provided a pressure temperature operated switch so arranged that it will open the ignition circuit in the event the oil pressure is not adequate for safe operation of the engine or in the event the cooling w ater temperature exceeds that at which the switch is set to operate. In addition there shall be installed in the cooling water intake a pressure reducing valve which will reduce the pressure of cooling water to that recommended by the engine manufacturer but in no case greater than 10 pounds per square inch.

3-09. Governor. - a. A governor shall be mounted directly on the engine and arranged for force-feed lubrication. It shall be of the non-hunting, precision type, capable of maintaining the engine speed within 5 per cent of rated speed during part-load changes from full-load to no-load.

b. The engine shall be provided with an automatic ignition cut-out switch that will shut the engine down when the engine speed exceeds that normally controlled by the governor. The cut-out switch shall be adjustable and provided w ith manual reset.

3-10. Exhaust. - a. The exhaust manifold shall be a close-grained grey iron casting water-jacketed for its entire length. A water-cooled flexible exhaust pipe shall be provided for installation between the exhaust manifold and the exhaust pipe embedded in the building wall. This exhaust line shall be similar and equal to that manufactured by the Packless Metal Products Company of Long Island City, New York.

b. Each engine shall be provided with an exhaust silencer

for mounting on the roof as shown on the drawings. The silencer shall be similar and equal to the No. MU-2 manufactured by the Maxim Silencer Company, or the equivalent silencer manufactured by the Burgess Battery Company, or the Vortox Type manufactured by the Engineering Specialty Company, New York, New York.

c. Each exhaust silencer shall be provided with a rain hood as indicated on the drawings. Rain hoods shall be made of 16-gauge, galvanized sheet iron in accordance with Federal Specification QQ-I-696.

3-11. Miscellaneous equipment. - a. Instrument panel. - A polished metal panelboard shall be installed on the engine and the following instruments and equipment mounted thereon:

One tachometer
One main oil line pressure gauge
One lubricating oil filter inlet gauge
One lubricating oil filter outlet gauge
Cranking motor-push-button switch
Ignition switch
Temperature gauges

b. Tools. - One set of special wrenches or tools shall be provided.

c. Flexible couplings. - The flexible coupling connecting the engine to the gear reduction unit shall be of the flexible, resilient cushion type similar and equal to "Faulk Steelflex," or "Morse Flexible Coupling."

3-12. Shop tests. - The manufacturer shall completely assemble each of the engines in his shop and measure the developed horsepower and torque at various speeds by means of a dynamometer. Each engine shall be run for 24 hours at full load, which shall be equal to the horsepower rating specified in Paragraph 3-03. The results of this test shall be shown graphically in the form of curves and the contractor shall submit certified copies of the test results to the contracting officer. The contractor shall give the contracting officer five days written notice of the time of making the shop tests. All shop testing shall be done in the presence of an authorized representative of the contracting officer.

3-13. Field tests. - After installation, each engine will be operated and tested for a sufficient period of time to demonstrate that it is in satisfactory operating condition and meets the requirements of these specifications. Any alterations necessary to bring the engines up to the requirements of the specifications shall be made by and at the expense of the contractor.

## SECTION IV. GEAR UNITS (Item 4).

4-01. Work included. - The contractor shall furnish three right-angle gear units for continuous transmission of the power from the horizontal gasoline engines to the vertical pump shafts. Each unit shall be ready for connection to its respective engine and pump.

4-02. Type and rating. - The gear unit shall be the self-contained type designed for transmitting power from the horizontal engine shaft through a set of spiral bevel gears to the vertical pump shaft. The horsepower rating shall be in accordance with the recommended practice of the American Gear Manufacturers Association, and the unit shall have a service factor of not less than 1.25. The gear unit shall be a standard unit that is regularly manufactured for service similar to that required by these specifications.

4-03. Housing. - The apparatus shall be enclosed in a rigid and compact housing made of close-grained cast iron. All joints shall be machine finished, oil tight, and dust proof. Suitable cover plates of the male and female type shall be provided that will permit easy access to the interior for examination and adjustment of the parts.

4-04. Gears. - The gears shall be of the precision generated, spiral bevel type, made of alloy steel and heat treated and lapped. The gears shall be designed to give the proper speed change and transmit the power without undue strain. The gears shall be so mounted that they will be in precise alignment at all times.

4-05. Shafts. - The shafts shall be made of forged, heat-treated steel and shall be of ample size to provide against deflection. The shafts shall be supported in anti-friction bearings of the radial thrust type. The bearings shall be of ample size and rating for the duty required of them. If the unit is of the solid-shaft type there shall be provided a rigid coupling below the base of the unit for attaching the intermediate pump shaft to the gear unit shaft.

4-06. Lubrication. - A lubricating system shall be provided that will positively and continuously supply the proper amount of oil to the bearings and gears. Spray lubrication shall be provided for the gear bath. An oil reservoir with a self-priming oil pump shall be provided in the bottom of the housing. An oil level indicator and an oil flow indicator shall be provided. The unit shall be self-cooling without the use of cooling water and when operating continuously under rated load the temperature of the lubricating oil shall not exceed 140 degrees F. Oil seals shall be provided at the shaft outlet but no stuffing box or glands shall be used.

4-07. Field tests. - After installation, each unit will be

operated and tested for a sufficient period of time to demonstrate that it is in satisfactory operating condition and meets the requirements of these specifications. Any alterations necessary to bring the gear units up to the requirements of the specifications shall be made by and at the expense of the contractor.

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United States Engineer Office
Providence, Rhode Island
May 1, 1939

Standard Form No. 31,
Approved by the President,
June 10, 1927.

Invitation No. 699-39-295

ORIGINAL ) Indicate
) which by
DUPLICATE) erasure.

STANDARD GOVERNMENT FORM OF BID
(Supply Contract)

Opening Date for this Bid

May 26, 1939, at 3 P. M.

The District Engineer,
U. S. Engineer Office,
819 Industrial Trust Bldg.,
Providence, R. I.

Place _____

Date _____

In compliance with your invitation for bids dated May 1, 1939, to furnish materials and supplies listed on the accompanying schedules, the undersigned, _____, a corporation organized and existing under the laws of the State of _____ an individual trading as _____ of the City of _____, hereby proposes to furnish, within the time specified, the materials and supplies at the prices stated opposite the respective items listed on the schedules and agrees, upon receipt of written notice of the acceptance of this bid within 60 days after the opening of the bids, to execute, if required, the Standard Government Form of Contract (Standard Form No. 32) in accordance with the bid as accepted, and to give bond, if required, with good and sufficient surety or sureties, for the faithful performance of the contract, within 10 days after the prescribed forms are presented for signature.

Discount will be allowed for prompt payment as follows:
10 calendar days _____ per cent; 20 calendar days _____ per cent;
30 calendar days _____ per cent; or as stated in the schedules.

(Time will be computed from date of the delivery of the supplies to carrier when final inspection and acceptance are at point of origin, or from date of delivery at destination or port of embarkation when final inspection and acceptance are at those points, or from date correct bill or voucher properly certified by the contractor is received, if the latter date is later than the date of delivery.)

_____
(Full name of bidder)

_____

_____
(Address)

NOTE:- See Government Instructions to Bidders and copy of the Standard Government Form of Contract, Bid Bond and Performance Bond which may be obtained upon application.

SCHEDULE

| Item No. | Articles or Services | Quantity | Unit | Unit Price | Amount |
|---|---|---|---|---|---|
| 1 | 36-Inch Pumps | 3 | each | ____ | ____ |
| 2 | 16-Inch Pump and Motor | 1 | each | ____ | ____ |
| 3 | Gasoline Engines | 3 | each | ____ | ____ |
| 4 | Right-Angle Gear Units | 3 | each | | |

Prices quoted are based on delivery f.o.b. cars at Hartford, Conn.

NOTE:- The amounts stated above will be subject to verification by the United States. In case of variation between unit bid prices and amounts stated by bidder, the unit prices will be considered to be his bid.

Domestic Material: It is hereby warranted that, in the event award is made to the undersigned, the unmanufactured articles, materials or supplies furnished the United States will have been mined

or produced in the United States, and the manufactured articles, materials and supplies will have been manufactured in the United States all from articles, materials or supplies mined, produced or manufactured, as the case may be , in the United States, except as noted below or otherwise indicated in this bid.

Exceptions _____
(If none, so state)

Manufacturer _____

Regular dealer _____

DATA SHEET

36-INCH PUMP

Manufacturer's name _____

Guaranteed capacity at 20 ft. total head _____

Capacity at 5 ft. total head _____

Capacity at 35 ft. total head _____

Speed in R.P.M. at rated capacity and head _____

Shut-off head _____

Type of impeller _____

Impeller material _____

Casing material _____

Shaft material _____

Smallest diameter of main drive shaft in inches _____

Type of thrust bearing _____

Type of radial bearing _____

Type and manufacturer of steady bearing _____

Type and manufacturer of flexible coupling _____

_____

Maximum efficiency of pump at rated speed _____

Weight of complete pump assembly exclusive of intermediate shaft, pounds _____

Weight of stationary parts, pounds _____

Weight of heaviest piece pounds _____

DATA SHEET

16-INCH PUMP

1. Pump:

   a. Manufacturer's Name _____

   b. Guaranteed Capacity at 13 ft. total head _____

   c. Capacity at 21 ft. total head _____

   d. Speed in R.P.M. at rated capacity and head _____

   e. Shut-off head _____

   f. Type of impeller _____

   g. Impeller material _____

   h. Casing material _____

   i. Shaft material _____

   j. Smallest diameter of main drive shaft in inches _____

   k. Thrust of pump taken by _____

   l. Maximum efficiency of pump at rated speed _____

   m. Weight of complete pump assembly exclusive of intermediate shaft, pounds _____

2. Electric Motor:

   a. Manufacturer's Name _____

   b. Type _____

   c. H.P. rating _____

   d. Full-load R.P.M. _____

   e. Voltage _____ Phases _____ Cycles _____

   f. Full-load current _____

   g. Power factor at full-load _____

DATA SHEET

16-INCH PUMP (Cont.)

2. Electric Motor (Cont.):

h. Starting current _____% full-load current

i. Starting torque _____% full-load torque

j. Breakdown torque _____% full-load torque

k. Efficiency at full-load____3/4 load _____1/2 load _____

l. Class of insulation _____

m. Bearing type _____

n. Frame construction, material _____ type _____

DATA SHEET

*GASOLINE ENGINES*

Manufacturer's name _____

Model or type _____

Number of cylinders _____

Bore _____

Stroke _____

Guaranteed continuous developed horsepower at rated speed (1200 r.p.m. or less) _____ h.p. at _____ r.p.m.

Fuel consumption at rated speed and maximum continuous developed horsepower _____

Number of carburetors _____

Silencer (Make and type) _____

Total weight of engine _____

DATA SHEET

RIGHT ANGLE GEAR UNIT

Manufacturer's name _____

Model or type _____

Horsepower rating at operating speed with service factor of 1.25 _____

Efficiency of unit at rated power and speed _____

Ratio of gear reduction _____

Housing material _____

Gear material _____

Type and size of bearings _____

Total weight _____

DATA SHEET

VALVES

1. 36" Gate Valves:

   a. Manufacturer _____

   b. Type or model number _____

2. 16" Gate Valves:

   a. Manufacturer _____

   b. Type or model number _____

3. 36" Check Valves:

   a. Manufacturer _____

   b. Type or model number _____

4. 16" Check Valves:

   a. Manufacturer _____

   b. Type or model number _____